United Nations A/AC.105/C.1/L.365/Add.4

General Assembly

Distr.: Limited
6 February 2018

Original: English

Committee on the Peaceful Uses of Outer Space
Scientific and Technical Subcommittee
Fifty-fifth session
Vienna, 29 January–9 February 2018

Draft report

VI. Space-system-based disaster management support

1. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 9, entitled "Space-system-based disaster management support".

2. The representatives of Argentina, Canada, China, Egypt, France, Germany, India, Indonesia, Israel, Japan, Mexico, Pakistan, the Republic of Korea, the Russian Federation, Saudi Arabia, the United States and Venezuela (Bolivarian Republic of) made statements under agenda item 9. A statement was also made under the item by the representative of Argentina on behalf of the Group of Latin American and Caribbean States. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

3. The Subcommittee heard the following scientific and technical presentations:

(a) "Space-based technology for disaster risk reduction in China: from policy to practice", by a representative of China;

(b) "Global satellite system for monitoring and forecasting Earth seismic activity", by a representative of Ukraine.

4. The Subcommittee had before it the following:

(a) Report on the United Nations International Conference on Space-based Technologies for Disaster Risk Reduction on the theme "Building resilience through integrated applications", held in Beijing from 23 to 25 October 2017 (A/AC.105/1156);

(b) Report on activities carried out in 2017 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (A/AC.105/1157);

(c) Report on the United Nations/Germany International Conference on International Cooperation towards Low-Emission and Resilient Societies, held in Bonn, Germany, from 22 to 24 November 2017 (A/AC.105/1181).

5. The Subcommittee noted with satisfaction the progress made with regard to activities held in 2017 in the framework of UN-SPIDER, including the continuing advisory support and other support provided through it for emergency response efforts.

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6. Some delegations reiterated the importance of intensifying coordination and international cooperation as a way of carrying out capacity-building programmes in Latin America and the Caribbean.

7. The Subcommittee noted that, with the continued support of its network of partners, UN-SPIDER had carried out a technical advisory mission to Nepal, as well as follow-up activities in El Salvador, Guatemala, Myanmar, Solomon Islands and Sri Lanka. The Subcommittee noted with satisfaction the capacity-building efforts in the form of training sessions that had been held in China, El Salvador, Guatemala and Sri Lanka, addressing specific requirements and providing follow-up to the UN-SPIDER technical advisory missions carried out in previous years.

8. The Subcommittee noted the synergies and cross-border actions facilitated by UN-SPIDER. It noted other capacity-building sessions that were planned and emphasized the need for increased capacity-building support in the various regions.

9. The Subcommittee welcomed the planned outreach activities of the Office for Outer Space Affairs, represented by UN-SPIDER, and its developing partnerships with United Nations entities, international organizations and Member States to continue promoting the use of space-based tools and information in global and regional initiatives, such as under the Sendai Framework for Disaster Risk Reduction 2015–2030, the 2030 Agenda for Sustainable Development and the Paris Agreement.

10. The Subcommittee noted with satisfaction the ongoing activities of States members of the Committee to increase the availability and use of space-based solutions in support of disaster risk reduction, in particular in the context of the Sendai Framework, and also in support of UN-SPIDER. Those activities included promoting emergency observation in the event of natural or technological disasters under the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, and under the Sentinel Asia programme and SERVIR Himalaya, which covered countries in Asia.

11. The Subcommittee also noted with satisfaction the efforts conducted under the Charter and Sentinel Asia to support disaster response efforts. The Charter had been activated 44 times in 2017, to support 29 countries; on two occasions, it had been activated to support several Caribbean States through one activation. Sentinel Asia had been activated 35 times in 2017, for 12 countries. In addition, the Subcommittee noted that Myanmar and Sri Lanka had recently been accepted as authorized users of the Charter and that Costa Rica and Paraguay had also applied.

12. The Subcommittee noted with satisfaction the activities conducted by several member States, directly or through the Charter or Sentinel Asia, to facilitate access to satellite imagery and space-based information to support disaster response efforts following cyclones in the southern Indian Ocean, hurricanes in the Caribbean, tropical storms in the Philippines, earthquakes in China, Mexico, the Republic of Korea and Saudi Arabia, floods and landslides in Bangladesh, China, Colombia, Canada, Guatemala, Haiti, Honduras, India, Nepal, Peru, Thailand, the Philippines, Saudi Arabia and Viet Nam, and in southern Africa, forest fires in Argentina, the Russian Federation and the United States, volcanic activity in Indonesia and sea-ice conditions and harmful algae blooms in China.

13. The Subcommittee also noted with satisfaction other activities of member States in the same area, such as the promotion, with the support of UN-SPIDER, of the universal access initiative of the Charter and the provision of national and regional data portals for the dissemination of information in near-real time. The Subcommittee noted the efforts of several member States through CEOS, in particular in the context of its Working Group on Disasters and its Recovery Observatory. The aim of the Recovery Observatory, a complementary mechanism to the Charter, was to contribute to reconstruction efforts in countries under the principle of "Build back better", as stipulated in the Sendai Framework.

14. The Subcommittee noted the relevance of online platforms for sharing and disseminating space-based data and information to monitor the impacts and evolution

of natural disasters and for providing decision makers and stakeholders access to such data quickly and easily. Member States incorporating such platforms included India, Indonesia, the Russian Federation and the United States.

15. Some delegations commented on their countries' efforts to integrate satellite data into early warning systems addressing floods, sand and desert storms, and forest fires.

16. Some delegations noted the usefulness of the extension of the COCONet (Continuously Operating Caribbean GPS Observational Network) project, which had been launched in 2016 to contribute to an improved understanding of seismic hazards.

17. The view was expressed that it was necessary to recognize that climate change was causing sea levels to rise and was exacerbating the impacts of storm surges and floods. The delegation expressing that view also expressed the view that the impacts of rising sea levels would manifest themselves in coastal cities worldwide and that coastal communities and their livelihoods would also be affected by phenomena such as salt intrusion. The delegation noted that, while many countries were implementing adaptation strategies in line with the Paris Agreement, the displacement of populations in coastal areas could not be avoided, nor could the decline in value of coastal properties.

18. The view was expressed that conferences addressing the contribution of satellite technologies to the implementation of the Sendai Framework and the Paris Agreement were useful.

19. The view was expressed that the GEONETcast service offered benefits as a low-cost platform for sharing space-based data. Currently, there were 70 GEONETcast stations operating in 18 countries.

20. The Subcommittee noted the in-kind contributions, including the provision of experts, made by States members of the Committee and regional support offices in 2017 to all technical advisory missions and related activities conducted by the Office for Outer Space Affairs through UN-SPIDER, and their efforts to share experiences with other interested countries.

21. The Subcommittee noted with appreciation the voluntary contributions made to the Office for Outer Space Affairs and its UN-SPIDER programme that were being made by member States, including the cash contributions from China and Germany, and again encouraged other member States to provide the Office's activities and programmes, including UN-SPIDER, with all necessary support, including increased financial support, to enable it to better respond to Member States' requests for assistance and to fully carry out its workplan for the next biennium.

VII. Recent developments in global navigation satellite systems

22. In accordance with General Assembly resolution 72/77, the Subcommittee considered agenda item 10, entitled "Recent developments in global navigation satellite systems", and reviewed issues related to the International Committee on Global Navigation Satellite Systems (ICG), the latest developments in the field of global navigation satellite systems (GNSS) and new GNSS applications.

23. The representatives of China, Egypt, India, Indonesia, Israel, Japan, Pakistan, the Republic of Korea, the Russian Federation, Spain and the United States made statements under agenda item 10. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

24. The Subcommittee had before it the following documents:

(a) Note by the Secretariat on the twelfth meeting of the International Committee on Global Navigation Satellite Systems (A/AC.105/1158);

(b) Report of the Secretariat on activities carried out in 2017 in the framework of the workplan of the International Committee on Global Navigation Satellite Systems (A/AC.105/1159).

25. The Subcommittee was informed that the Office for Outer Space Affairs, as the executive secretariat of ICG, handled coordination for the planning of meetings of ICG and its Providers' Forum, in conjunction with sessions of the Committee and its subsidiary bodies. It was noted that the Office also maintained a comprehensive information portal for ICG and users of GNSS services and continued to play an active role in facilitating cooperation and communication among the providers and users of GNSS.

26. The Subcommittee expressed its appreciation to the Office for its efforts in promoting the use of GNSS throughout its capacity-building and information dissemination initiatives, particularly in developing countries.

27. The Subcommittee noted with appreciation the financial contributions made by the United States and the European Commission to the Office in support of GNSS-related activities, ICG, its Providers' Forum and its working groups.

28. The Subcommittee noted with satisfaction that the twelfth meeting of ICG and the nineteenth meeting of the Providers' Forum, organized by the Cabinet Office and the Ministry of Foreign Affairs of Japan, on behalf of the national Government, had been held in Kyoto, Japan, from 2 to 7 December 2017.

29. The Subcommittee noted the progress made in ICG, especially in the area of compatibility and interoperability among the different systems, and in the area of GNSS spectrum protection and interference detection and mitigation. The Subcommittee recalled that ICG had invited an exchange of information related to GNSS spectrum protection and interference detection and mitigation under its current agenda item on recent developments in GNSS. Considering the need to ensure continuous receiving of GNSS signals, the importance of that topic was noted.

30. The Subcommittee also noted that the thirteenth meeting of ICG would be hosted by China, in Xi'an, from 4 to 9 November 2018. The Subcommittee also noted the expression of interest from India to host the fourteenth meeting of ICG, in 2019, and by the Office for Outer Space Affairs to host the fifteenth meeting, in 2020.

31. The Subcommittee further noted that the Global Positioning System (GPS) of the United States continued to be a central pillar in an emerging international system of GNSS, and that the United States remained engaged in activities to ensure both compatibility and interoperability among the different services.

32. The Subcommittee noted that the United States had continued to broadcast GPS signals free of direct user charges and to work toward the launch of the next generation of satellites, GPS Block III, which would provide greater capability and improved service with the broadcast of the third civilian signal, "L1C". Work on an upgraded ground control system, called "OCX", in support of the GPS Block III satellites, was continuing and, with the first launch expected in 2018, performance improvements and increased capabilities for all users were anticipated.

33. The Subcommittee also noted that the International Satellite System for Search and Rescue (COSPAS-SARSAT), a satellite-aided search and rescue programme for which the Medium-altitude Earth Orbit Search and Rescue (MEOSAR) distress signals relayed by GPS and Galileo of the European Union were in early operational capability, had been used in search and rescue efforts. It further noted that the MEOSAR system had been using upgraded GPS satellites, the GNSS of the Russian Federation (GLONASS) and Galileo of the European Union, orbiting in space at an altitude of between 19,000 and 24,000 km. It noted that the MEOSAR system provided near-instantaneous distress alerts and locations as well as significantly more satellites compared with the current constellations used in search and rescue. It was also noted that China was considering joining and contributing to this worldwide search and rescue capability.

34. The Subcommittee further noted that the civilian services of GLONASS were provided free of direct user charges and were accessible, effective and fully responsive to the needs of different users, and that the launch of the latest GLONASS-M navigation satellite into orbit supported the space segment of the system.

35. The Subcommittee noted that the System of Differential Correction and Monitoring, an augmentation of GLONASS, continued to be updated and was to be used in civil aviation for enhancing navigation precision. The provision of GLONASS-based precise point positioning to support applications requiring real-time access was being organized. A network of ground-based stations had been developed for the continuous monitoring of the characteristics of the GLONASS system and other GNSS in order to assess the quality of their performance.

36. The Subcommittee also noted that the interface control document for GLONASS Code Division Multiple Access signals in bands L1, L2 and L3 had been published in English. An open service performance standard was currently being developed, which demonstrated commitment to providing a basic performance standard for the system's users. The Subcommittee further noted that international cooperation existed that was aimed at making GLONASS an essential element of the international GNSS infrastructure, with benefits for users worldwide.

37. The Subcommittee further noted that the European GNSS Galileo provided a range of state-of-the-art positioning, navigation and timing services to users worldwide. The full Galileo constellation would consist of a total of 30 satellites and was expected to be completed by 2020.

38. The Subcommittee noted that the Galileo Security Monitoring Centre, an integral part of the Galileo infrastructure, had been facilitating the centralization of access to the Galileo Public Regulated Service and providing Galileo with security monitoring services in order to detect events, caused either accidentally or deliberately, that could result in the disruption of services.

39. The Subcommittee also noted that the BeiDou Navigation Satellite System (BDS), a global navigation satellite system compatible with other GNSS, had been established by China. The System was in full service and had provided positioning, navigation, timing and short-message communication services to the Asia-Pacific region since 2012. Four satellites of a new generation of satellites, the BeiDou-3 system, had been launched, and 18 satellites were scheduled to be launched by the end of 2018 as part of efforts to provide navigation and positioning services to countries involved in the Belt and Road Initiative.

40. The Subcommittee further noted that the BeiDou-3 system transmitted more refined navigation signals, with positioning accuracy of between 2.5 and 5 metres. The BDS industry chain had been completed, and BDS chips were used on a large scale, with the processing precision refined to 28 nanometres. BDS had been widely adopted in fields such as public security, transport, fisheries, electricity, forestry and disaster response. It was noted that, in order to promote the wide application of BDS, six versions of signal interference control documents, one service performance specifications and the BDS white paper had been published. The system would constitute a complete space constellation and would provide global coverage by 2020.

41. The Subcommittee noted that India was currently implementing its satellite navigation programme, which consisted of two systems: the GPS-aided Geostationary Augmented Navigation System (GAGAN), which was a satellite-based augmentation system, and the Indian Regional Navigation Satellite System (IRNSS), which was an independent regional system. GAGAN had been certified for Navigation Performance, 0.1 Nautical Mile service level and for Approach with Vertical Precision certification by the Directorate General of Civil Aviation of India, thus enabling en route navigation and precision approach services using GAGAN. The Subcommittee also noted that GAGAN was the first satellite-based augmentation system to serve the equatorial region, and that it had been providing satellite-based navigation services

with the accuracy and integrity required for civil aviation applications, as well as efficient air traffic management services over Indian airspace.

42. The Subcommittee also noted that the IRNSS constellation, also known as NavIC (Navigation with Indian constellation), provided satellite-based navigation services. It consisted of seven satellites: three in geostationary orbits and four in geosynchronous orbits. All seven IRNSS satellites, including IRNSS-1A and IRNSS-1G, had been put into orbit using the Polar Satellite Launch Vehicle (PSLV) of India. IRNSS-1A had been used exclusively for messaging services and the IRNSS-1I satellite was scheduled to be launched on board PSLV in the first half of 2018.

43. The Subcommittee further noted that Japan was currently constructing a Quasi-Zenith Satellite System (QZSS), named "Michibiki". The QZSS, a navigation satellite system that was compatible and interoperable with GPS, had been enabled to extend availability time by sharing the same positioning signals.

44. The Subcommittee noted that QZSS would be expanded and upgraded to become an operational regional satellite-based navigation system to improve positioning in the Asia-Pacific region. A constellation of four satellites would be established and the formal operation would begin during the 2018 Japanese fiscal year. A constellation of seven satellites would enable sustainable positioning to be completed by around the 2023 Japanese fiscal year.

45. The Subcommittee noted that the Korean Satellite-Based Augmentation System development, implementation and establishment programme, called "Korea Augmentation Satellite System" (KASS), had been initiated in 2014 with the objective of improving the performance, reliability and accuracy of the GPS navigation signals in the Korean peninsula. It was also noted that the KASS programme office had been established in the Korea Aerospace Research Institute.

46. The Subcommittee further noted that KASS would consist of seven reference stations, two processing stations, two control stations, three uplink stations and two geostationary satellites, and that KASS would meet the Approach with Vertical Guidance (APV-I) requirements, as defined in the ICAO standard. Following the KASS programme, a regional satellite navigation system had to be built, and would thus contribute to the international community as a regional provider of GNSS service. It was noted that Open Service would be initiated in 2020 and the Safety of Life service would be initiated by the end of 2022.

47. The Subcommittee noted that other member States had reported on their activities in the use of GNSS technology for a wide range of applications. It was noted that those activities could be seen as a means for increasing the overall awareness of multi-GNSS within the scientific and engineering communities.

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